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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/717,313	11/20/2003	Stefan Felter	2380-776	6489

23117 7590 04/04/2006

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EXAMINER

EKONG, EMEM

ART UNIT PAPER NUMBER

2617

DATE MAILED: 04/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/717,313

Applicant(s)

FELTER, STEFAN

Examiner

EMEM EKONG

Art Unit

2617

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11, 20-34, & 43-49 is/are rejected.
- 7) ☒ Claim(s) 12-19 and 35-42 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>06/01/03</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Specification***

1. The abstract of the disclosure is objected to because the number of words exceeds 150. Correction is required. See MPEP § 608.01(b).

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless – (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-10, and 27-33 are rejected under 35 U.S.C. 102(e) as being anticipated by U. S. Publication No. 2003/0012267 A1 to Jitsukawa et al.(Jitsukawa).

Regarding claim 1, Jitsukawa discloses a wireless communication receiver comprising: an antenna structure which acquires dimensionally differentiated signals (see figures 1-3, pars. 6, 30, and 38); a joint searcher (pars. 47, searcher) and channel estimator (pars. 37-46, phase difference estimation portion) which essentially concurrently considers the dimensionally differentiated plural signals provided by the plural antennas for determining both a time of arrival and channel coefficient (see figures 2, 4, and pars. 32-71).

Regarding claim 27, Jitsukawa discloses a method of operating a wireless communication receiver comprising: acquiring dimensionally differentiated signals at an antenna structure (see figures 1-3, pars. 6, 30, and 38); concurrently using the dimensionally differentiated signals for determining both a time of arrival and channel coefficient (see figures 2, 4, and pars. 32-71).

Regarding claims 2, Jitsukawa discloses the apparatus of claim 1, wherein the joint searcher and channel estimator essentially concurrently considers the dimensionally differentiated plural signals provided by the plural antennas for determining plural times of arrival and plural channel coefficients, an arriving wavefront being represented by one of the plural times of arrival and a corresponding one of the plural channel coefficients (see figure 3).

Regarding claims 3, 6, 28, and 31, Jitsukawa discloses the apparatus and method of claims 1 and 27 wherein the antenna structure comprises an array of plural antennas, and wherein the signals acquired by different antennas of the array are dimensionally differentiated with regard to a spatial dimension; and wherein the antenna array comprises a uniform linear array of plural antennas (see figure 3, and pars. 33-40).

Regarding claims 4 and 29, Jitsukawa discloses the apparatus and method of

claims 3 and 28, wherein the time of arrival and the channel coefficient are essentially concurrently determined by the joint searcher and channel estimator (pars. 37-46).

Regarding claims 5 and 30, Jitsukawa discloses the apparatus and method of claims 4 and 29, wherein the time channel coefficient is a composite channel coefficient which takes into consideration channel impulse responses for channels associated with each of the plural antennas in the antenna array (see figure 8).

Regarding claims 7, and 32, Jitsukawa discloses the apparatus and method of claims 1 and 27, wherein the antenna structure comprises an antenna which provides signals for each of successive sets of pilot data received by the antenna as the dimensionally differentiated signals, whereby the signals acquired by the antenna are dimensionally differentiated with regard to a temporal dimension (par. 38).

Regarding claims 8 and 33, Jitsukawa discloses the apparatus and method of claims 1 and 27, further comprising a detector which utilizes the channel coefficient and the time of arrival to provide a symbol estimate (pars. 6-14).

Regarding claim 9, Jitsukawa discloses the apparatus of claim 1, wherein the wireless communication receiver is a mobile terminal (par. 16).

Regarding claim 10, Jitsukawa discloses the apparatus of claim 1, wherein the

wireless communication receiver is a network node (pars. 1, and 30, base station).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 11, 20-26, 34, and 43-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jitsukawa in view of U. S. Patent No. 5,790,606 to Dent.

Regarding claims 11 and 20, Jitsukawa discloses the apparatus of claim 1, wherein the joint searcher and channel estimator.

However, fails to disclose an antenna signal matrix in which complex values indicative of the dimensionally differentiated signal received in a sampling window are stored as a function of a sampling window time index and a dimensional differentiation index; a correlator and a parametric estimator which locates value(s) in the antenna

signal matrix for use in determining the time of arrival and the channel coefficient ; an analyzer which uses the value(s) located by the correlator to generate the time of arrival and the channel coefficient.

Dent discloses an antenna signal matrix in which values indicative of the dimensionally differentiated signal received in a sampling window are stored (see figures 1 and 7, and col. 4 line 1-col. 6 line 17).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Jitsukawa, and have an antenna signal matrix in which complex values indicative of the dimensionally differentiated signal received in a sampling window are stored as a function of a sampling window time index and a dimensional differentiation index; a correlator and a parametric estimator which locates value(s) in the antenna signal matrix for use in determining the time of arrival and the channel coefficient; an analyzer which uses the value(s) located by the correlator to generate the time of arrival and the channel coefficient for the purpose of determining and generating the time of arrival and the channel coefficient.

Regarding claims 21-26, 34, and 43-49, the combination of Jitsukawa and Dent discloses the apparatus of claim 20, wherein the antenna structure comprises an array of plural antennas, and wherein each spatial frequency parameter in the parametric output estimation vector corresponds to a possible direction of arrival;

wherein the analyzer uses absolute values of elements of the parametric output estimation vector to determine the time of arrival and direction of arrival of the arriving wavefront;

wherein the parametric output estimation vector has a sampling window time index and a direction index; and wherein for an element of the parametric output estimation vector having a sufficiently high absolute value;

wherein the antenna structure comprises an antenna which provides signals for each of successive sets of pilot data received by the antenna as the dimensionally differentiated signals, and wherein each spatial frequency parameter corresponds to a possible doppler shift;

wherein the parametric output estimation vector has a sampling window time index and wherein the analyzer uses absolute values of elements of the parametric output estimation vector to determine the time of arrival and doppler shift of an arriving wavefront;

wherein the parametric estimate output vector has a sampling window time index and wherein for an element of the parametric estimate output vector having a sufficiently high absolute value the analyzer uses the sampling window time index for an element of the parametric output estimation vector having a sufficiently high absolute value to determine the time of arrival of the arriving wavefront (see figures 3 and 8, and pars. 33-40).



***Allowable Subject Matter***

7. Claims 12-19, and 35-42 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respect to receiver:

U.S. Pat. No. 6,347,234 B1 to Scherzer

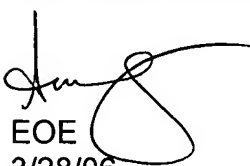
U.S. Pub. No. 20040017846 A1 to Fernandez-Gorbaton et al..


Any inquiry concerning this communication or earlier communications from the examiner should be directed to EMEM EKONG whose telephone number is 571 272 8129. The examiner can normally be reached on 8-5 Mon-Fri..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester Kincaid can be reached on 571 272 7922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
EOE  
3/28/06

  
NICK CORSARO  
PRIMARY EXAMINER